

REMARKS/ARGUMENTS

This paper is submitted in response to the Office Action mailed October 16, 2007. Reconsideration is respectfully requested.

Claims 1-7, 9, 11, 14-28, 32, 33, 35-41, 43, 45, 47-49, 54-66, 70, and 71 were examined. All of the pending claims stand rejected.

In this response, claims 16, 21, 55, and 60 have been amended, new claims 73-76 have been added, and claims 1-7, 9, 11, 14, 15, 35-41, and 45 have been canceled without prejudice. In addition, claims 43, 47-49, and 54 have been amended to depend from new independent claim 73. As explained below, it is respectfully submitted that claims 16-28, 32, 33, 43, 47-49, 54-66, 70, 71, and 73-76, as amended, define patentably over the art of record.

On behalf of the Applicant, the undersigned attorney thanks Examiner Baisa for the courteous and helpful telephonic interview conducted on January 8, 2008. Although no agreement was reached on the allowability of any of the claims, it was agreed that certain amendments to the claims would overcome the specific rejections set forth in the Office Action, as explained below.

I. Amendments to the Specification and Drawings

The specification has been amended to complete the description of the structure clearly shown in Fig. 10.

The drawings have been amended to correct errors in the reference numerals and designation lines in Figs. 9 and 10, and to correct a component label in Fig. 14.

No new matter has been added by the amendments to the specification and drawings.

II. Rejection under 35 U.S.C. §112

Claims 16, 21, 55, and 60 were rejected under 35 U.S.C. §112, second paragraph, on the grounds that certain claim language was unclear. Specifically, the Examiner's position was that the recitation in claim 16 (and similar recitations in claims 21, 55, and 60) that "the second terminal is insulated from the first metal layer and electrically connected to the second metal layer by a conductive channel which passes through and is insulated from the first metal layer and device material" left unexplained whether "the second terminal needs to be insulated from the device material." (Office Action of 10/16/07, p. 2.) In the interview of January 8, 2008, it was agreed that this potential ambiguity could be removed by amending these claims to recite that the second terminal is "insulated from the first metal layer and physically separated from the layer of device material...." Upon further reflection, Applicant

has considered that the purported potential ambiguity may be more effectively addressed by amending these claims to explicitly recite how the first and second terminals are electrically connected to the layer of device material and to the respective electrodes, as shown, for example, in Figs. 8-10. It is respectfully submitted that claims 16, 21, 55, and 60, as amended, are now in compliance with Section 112.

III. Rejections under 35 U.S.C. §102(b)

Claims 16-28, 32, 33, 43, 47-49, 54-66, 70, and 71 were rejected under 35 U.S.C. §102(b) as anticipated by US 6,377,467 – Chu et al. (“Chu”). This rejection was discussed in the above-mentioned telephonic interview, and it was agreed that amending these claims to recite that the second terminal is “insulated from the first metal layer and physically separated from the layer of device material....” would define over Chu. As discussed above, in order to more effectively overcome the rejection under Section 112, Applicant has amended the claims to more clearly define the structural relationship amongst the several components. As discussed below, it is respectfully submitted that these claims, as amended, define patentably over Chu.

The Chu reference shows a first pair of terminals 16 connected by a first conductive interconnection channel 20, and a second pair of terminals 18 connected by a second conductive interconnection channel 22, wherein both of the interconnection channels 20, 22 are in intimate physical contact with the device material layer 10. As discussed in the specification of the subject application, the construction of the Chu reference requires that a section of the electrodes adjacent each of the interconnections be removed to provide an insulated isolation barrier, thereby reducing the effective area of the device. See US 2006/0055501, Paragraph 0007.

The present invention provides a greater effective area for the internal electrodes, and thus allows either greater efficiency for a given “footprint” or equivalent efficiency with a smaller footprint, by providing internal electrodes that cover the entire major surfaces of the device material layer. To accomplish this result, the external conductive interconnects (e.g., the conductive channels 66, 68 shown in Figs. 8 and 9) are completely insulated from the internal electrodes by insulation barriers (such as the barriers 44, 46 shown in Fig. 8). The electrical connection between a terminal pad on the bottom surface of the device (i.e., the pad 96 in Fig. 9) and the electrode adjacent the opposite side of the device (i.e., the electrode 14) must therefore be provided by the conductive elements 96, 86 between the conductive channel 68 and the electrode 14.

The above-noted distinction between the claimed invention and the Chu reference is clarified by the above amendments to claims 16, 21, 55, and 60. Specifically, claims 16 and 55, as amended, now define a first terminal that is “electrically connected to the first metal layer,” and a second terminal that is “insulated from the first metal layer and electrically connected to the second metal layer by (i) a conductive channel which passes through and is insulated from the first metal layer and the layer of device material, and (ii) a conductive element that electrically connects the conductive channel to the second metal layer; whereby the first terminal is electrically connected to the layer of device material only through the first metal layer, and the second terminal is electrically connected to the layer of device only through the second metal layer.”

Thus, the amended claims now define the electrical connections amongst the various elements of the device, as well as the structure that provides these connections, in both the symmetrical embodiments of Figs. 9 and 11, and the asymmetrical embodiment of Fig. 10. It is respectfully submitted that the Chu reference neither teaches nor suggests these limitations.

Specifically, as mentioned above, the conductive channels in Chu are not insulated from the device layer; they are in intimate contact with it. Second, the claims, as amended, recite a conductive element that electrically connects the conductive channel to the second metal layer. This refers, for example, to the upper terminal pad 96 and the upper internal conductive interconnection 86 shown in Fig. 9, or the metal plating layer 110 in Fig. 10. No analogous structure is shown in Chu. Third, the amended claims now define a conductive path between the terminals and the device material layer that is patentably distinct from that shown in Chu. Specifically, the first terminal is now defined as being electrically connected to the device material layer only through the first metal layer, and the second terminal is now defined as being electrically connected to the device material layer only through the second metal layer. In Chu, by contrast, each terminal 16, 18 is not only electrically connected to the device material layer 10 through one of the internal electrodes 12a, 12b, there is also an electrical connection (albeit a connection that may not have a significant performance effect) between each terminal and the device material layer through the conductive channels 20, 22 that are in direct, intimate contact with the device material layer.

For the reasons set forth above, it is respectfully submitted that independent claims 16 and 55, as amended, define patentably over Chu, taken by itself or in any combination with the other art of record that may suggest itself to those skilled in the art. It is therefore respectfully submitted that claims 16 and 55, as amended, are patentable over the art of record.

Claims 17-28 depend from claim 16, and further define the patentable subject matter of claim 16. Claims 56-66, 70, and 71 depend from claim 55 and further define the patentable subject matter of claim 55. It is therefore respectfully submitted that claims 17-28, 56-66, 70, and 71, as amended, are allowable. In particular, claims 21 and 60 depend from claims 16 and 55, respectively, and have been amended to conform to their respective base claims with analogous terminology relating to the symmetrical embodiments of Figs. 9 and 11. These claims thus explicitly define the novel and non-obvious structure discussed above, as applicable to the symmetrical embodiments of Figs. 9 and 11.

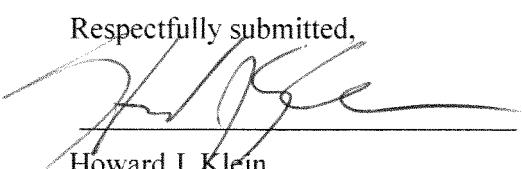
New independent claim 73 has been added to define a method of manufacturing a matrix of electronic devices. Claim 73, which replaces canceled claim 35, is respectfully submitted to define a method that is neither taught nor suggested by Chu, either by itself or in combination with the art of record. Claims 43, 47-49, and 54 have been amended to depend from new claim 73. New dependent claims 74-76 likewise depend from claim 73. It is respectfully submitted that claims 73, 43, 47-49, 54, and 74-76 define patentably over the art of record, and should be allowed.

IV. Summary and Conclusion

In summary, it is respectfully submitted that claims 16-28, 32, 33, 43, 47-49, 54-66, 70, 71, and 73-76, as amended, define patentably over the art of record, and should be allowed. Passage of the application to issue is therefore earnestly solicited.

Should any issues remain to be resolved in the application, the Examiner is respectfully requested to telephone the undersigned attorney to expedite the prosecution of this application to issue.

Respectfully submitted,


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Date: January 15, 2008

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Attorney Docket No. P-0205-PCT-PA